REMARKS

Overview of the Final Office Action and Advisory Action

As of the Final Office Action and the subsequent Advisory Action, claim 1 stands rejected under 35 U.S.C. § 112, first paragraph for failing to comply with the written description requirement, claims 1-6 and 11-12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,242,764 to Ohba ("Ohba"), and claims 7-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohba in view of U.S. Patent 5,771,110 to Hirano ("Hirano").

Status of the claims

Claim 1-3, 5-8, and 12 have been amended.

Claim 13 has been newly added.

Claims 1-13 are now pending.

Newly added dependent claim 13

Claim 13, which depends from independent claim 1 has been newly added. Support for the new claim 13 can be found in paragraph 0028 of the specification.

Claim 1 is patentable under 35 U.S.C. § 112, first paragraph

The Final Office Action states that claim 1 contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention.

Further, the Advisory Action states that the 112 rejection stands because it is not explicitly clear what the order of the steps are for the deposition of the thermal radiation absorption layer. The Examiner states that that the specification does not conclusively state that the layer was applied prior to deposition of the material onto the growth area of the substrate.

Independent claim 1 has been amended to remove the limitation "wherein the thermal radiation absorption layer is applied before deposition of the material onto the growth area of the substrate wafer", which the Examiner alleges is not supported in the specification.

Applicants' submit that this rejection is now moot.

Claims 1-6 and 11-13 are patentable under 35 U.S.C. § 102(b)

With respect to claim 1, the Office Action states that Ohba teaches all of Applicants' recited elements.

Independent claim 1 has been amended to point out more clearly the subject matter that Applicants' regard as the invention. Applicants' amended independent claim 1 recites a method for depositing a material (3) on a substrate wafer (1). The method includes: (a) providing the substrate wafer (1), which has a growth area (4) intended for a later material deposition; (b) applying a thermal radiation absorption layer (2), which exhibits a good absorption of thermal radiation, on a rear side (5) of the substrate wafer (1) which faces away from the growth area (4); (c) heating the substrate wafer (1) to a deposition temperature; and (d) depositing a material (3) onto the growth area (4) of the substrate wafer (1) by an MOVPE method, wherein the substrate wafer (1) is heated by the thermal radiation absorption layer (2) during MOVPE (metal organic vapor phase epitaxy). Support for this claim amendment can be found in paragraphs 0005-0007 of the specification.

Applicants' amended independent claim 1 is directed to a method that is especially suitable for growing a semiconductor material on a substrate wafer using a MOVPE technique. The thermal radiation absorption layer is applied to the rear side of the substrate that faces away from the growth area. By means of this absorption layer, the substrate wafer is heated to the deposition temperature during growth of the semiconductor material. The absorption layer permits a homogenous temperature distribution on the substrate wafer during growth of the semiconductor material.

Ohba teaches a GaN-based compound semiconductor light-emitting element that includes an AlN buffer layer, a GaN lattice strain moderating layer, and an n-type AlGaN contact layer formed on the layer. The GaN lattice strain moderating layer has a lattice constant larger than that of the AlN buffer layer. On the other hand, the contact layer has a lattice constant smaller than that of the AlN buffer layer. Further, the GaN lattice strain moderating layer has a thickness falling within a range of between 0.01 μm to 0.5 μm. Further, Ohba at col. 9, lines 24-28, states that "an electrically conductive material is used for forming the substrate and an electrode is mounted to a back surface of the conductive substrate, with the result that the p-side electrode can be brought into contact with a heat dissipator". Specifically, Ohba (col. 9, lines 28-32; Fig. 6) teaches that each of a SiC substrate 501 and a SiC buffer layer 503 is doped with an n-type impurity and, thus, exhibits an n-type conductivity. Also, an n-side electrode 522 is formed on the back surface of the n-type SiC substrate 501. Thus, Ohba teaches a device that has an n-side metal contact layer, and that this contact layer is applied to the rear side of the substrate. Further, Ohba discloses a MOCVD process wherein an SiC substrate or sapphire substrate is put on a susceptor, which also acts as a heater (see col. 9, lines 51-53 of Ohba).

In contrast to Applicants' recited invention, Ohba does not teach or suggest that the SiC

substrate or sapphire substrate is heated by a thermal radiation absorption layer during MOCVD. Further, Ohba does not teach or suggest that the n-side electrode 522 underneath the substrate is already formed on the substrate when the substrate is put on the susceptor. Electrode layers, such as layer 522 disclosed in Ohba, are applied to the rear side of a substrate after the device structure has been grown. Moreover, Ohba does not teach or suggest that the n-side electrode 522 has the quality of a thermal radiation absorption layer.

As discussed in paragraph 0005 of Applicants' published specification, in order to improve the heat input into a substrate wafer during MBE (molecular beam epitaxy), it is known to apply metal layers on the rear side of the substrate wafer, which can absorb the thermal radiation better than the substrate wafer.

As discussed at paragraph 0006 of Applicants' published specification, a metal layer placed on the rear side of a substrate, such as the substrate of the structure disclosed in Ohba, would lead to contamination of the reactor gas in a MOCVD apparatus. Previously, such metal layers were not used in MOVPE (metal organic vapor phase epitaxy), because such an additional layer on the rear side of the substrate wafer could lead to the introduction of contaminants in the reactive gas space. Applicants have achieved exactly what could not previously be achieved, i.e., the application of a thermal radiation absorption layer on the rear side of a substrate wafer, wherein the substrate wafer is heated by the thermal radiation absorption layer during MOVPE, as recited in Applicants' amended independent claim 1. Ohba fails to teach these limitations.

In view of the foregoing, it is respectfully submitted that Ohba does not teach or suggest the subject matter recited in Applicants' amended independent claim 1. Specifically, Ohba does not teach or suggest a method for depositing a material on a substrate wafer wherein the substrate wafer is heated by the thermal radiation absorption layer during MOVPE.

Dependent claims

Claims 2-6, and 11-13, which depend directly or indirectly from the independent claim 1, incorporate all of the limitations of independent claim 1 and are therefore patentably distinct over Ohba for at least those reasons provided for independent claim 1.

Claims 7-10 are patentable under 35 U.S.C. § 103(a)

With respect to claims 7-10, the Office Action states that the combination of Ohba and Hirano teaches all of Applicants' recited elements.

Ohba has been previously discussed, and it is clear that Ohba does not teach or suggest the invention recited in Applicants' independent claim 1. Specifically, Ohba does not teach or suggest a method for depositing a material on a substrate wafer wherein the substrate wafer is heated by the thermal radiation absorption layer during MOVPE.

Hirano discloses a method of fabricating a thin film transistor by setting the temperature of a heat treatment for crystallizing an active layer which is formed on a substrate at a level not deforming the substrate and activating an impurity layer in a heat treatment method different from that employed for the heat treatment, and a semiconductor device prepared by forming a heat absorption film, a semiconductor film, a gate insulating film, and a gate electrode on a substrate, the heat absorption film being provided within a region substantially corresponding to the semiconductor film.

Because Ohba does not teach or suggest the subject matter recited in independent claim 1, and because Hirano does not teach or suggest the elements of claim 1 that Ohba is missing, the claimed invention is patentable over the combination of these references.

Dependent claims

Claims 7-10, which depend directly or indirectly from the independent claim 1, incorporate all of the limitations of independent claim 1 and are therefore patentably distinct over Ohba and Hirano for at least those reasons provided for independent claim 1.

Conclusion

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of all rejections, and allowance of all pending claims in due course.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

Respectfully submitted,

COHEN, PONTANI, LIEBERMAN & PAVANE LLP

By Thomas Langer

Thomas Langer
Reg. 27,264
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

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